

CLAIMS

1. Static generator of compressed hot air for delivery to cyclically operated utilizing appliances intended for example for operations of heating, sealing or cutting thermoplastic films or sheets, of the type comprising at least one heat source usually consisting of an electrical resistance controlled by temperature probes (3) to heat a flow of air or other gas under pressure which is forced through the said generator and then directed to the utilizing appliance, characterized in that the electrical resistance is housed in a composite body made of a material which is a good heat conductor, externally insulated so as not to leak heat into the external environment and machined in any way so that it comprises internally at least two separate and offset channels (4, 5) having identical dimensional characteristics and having essentially equal surface areas of contact with the resistance and essentially equal coefficients of heat exchange and that are provided with respective inlet ports (112, 113) and with respective outlet ports (118, 119), the inlet ports being connectable as required through switching-valve means (16) to the source (17) supplying the compressed air for heating, while the two discharge ports of the said channels are connected, one to the utilizing appliance (21), for example to the sealer, to the thermal conditioning station, to the cutting station or to another cyclically operated utilizing appliance and the other discharge port is connected to an exhaust duct (19) that ends in any position remote from the said utilizing appliance, the whole in such a way that by supplying one or other of the said channels with the stream of compressed ambient air, the compressed hot air produced by the generator can be sent to the utilizing appliance or to the said exhaust duct while maintaining unchanged heat exchange conditions between the resistance and the stream of air whatever path the air flows, owing to the structural identity and to the uniformly distributed offset locations of the said channels.
2. Generator according to Claim 1, characterized in that the internal channels (4, 5) of the said generator, which alternately carry the stream of air to be heated and which prevent direct contact between the air and the electrical resistance, are shaped

as adjacent cylindrical helices, like the threads of a two-start screw.

3. Generator according to Claim 2, characterized in that it comprises a central body (1) made of for example aluminium or its alloys of cylindrical shape and round cross section with an axial cavity (2) capable of accommodating at least one preferably armoured electrical resistance, housed adjacent to which there are also temperature probes (3) that monitor the operation of the generator in relation to predetermined temperature limits, the said body (1) being machine-recessed on the external lateral surface, in such a way as to be wrapped, like the thread of a two-start screw, by two adjacent channels of cylindrical helical form (4, 5), having identical dimensional characteristics and having equal surface areas and equal coefficients of heat exchange in the direction of the said seat (2) with the electrical resistance, these channels (4, 5) communicating via their opposite ends with respective holes (104, 204 and 105, 205) having identical dimensional characteristics located on the unmachined end portions (101, 201) of the central body (1) and arranged parallel to the axis of this body, which is covered externally, for example with slight interference, by a tubular jacket (6) of any suitable material, caps (7, 8) being connected in intimate contact on the ends of said central body (1), the said caps being made of any suitable material or alloy of materials with a high degree of heat insulation and for example machinable by machine tools, cylindrically shaped, that are fixed for example by screws (9, 109) or some other suitable method to the ends of a tubular jacket (10) of any suitable material, of a diameter appropriately greater than that of the internal jacket (6), and the gap (11) between the two jackets being occupied by any suitable material with high characteristics of heat insulation, which prevents any leakage of heat to the exterior, one of the said caps (7) containing internal ducts (112, 113) which on the one hand are connected to the respective end ducts (104, 105) of the said helical channels and on the other hand are fixed to the connectors (12, 13) which, through pipes (14, 15) and a switching-valve means (16) can be connected alternately and quickly to a pipe (17) that supplies the generator with the compressed air at for example room temperature, the opposite cap (8) containing

internal ducts (118, 119) connected at one end to the respective other end ducts (204, 205) of the said helical channels (4, 5) and at the other end the duct (119) being connected by a connector to a discharge pipe (19), while the duct (118) is connected through one or more connectors (18) to one or more pipes (20) that supply the working unit or utilizing appliance (21) which ejects the compressed hot air and is characterized by cyclical operation.

4. Generator according to Claim 3, characterized in that at least the internal tubular jacket (6) surrounding the inner body (1) with the cylindrically helical channels (4, 5) is made for example from stainless steel or other suitable material.

5. Generator according to Claim 1, characterized in that because there is no leakage of heat, the said generator can be located statically in the immediate vicinity of the utilizing appliance (21) and of the packaging film which the latter is handling.

15

6. Generator according to Claim 5, characterized in that the said generator may incorporate the utilizing appliance to which it is supplying the hot air.

7. Generator according to Claim 6, characterized in that if it is intended for the formation of a sealer that projects at least one hot air knife onto the overlapping edges of the film (F) to be sealed, the said generator is oriented at right angles to the said film edges, the caps (8) with the hot air outlet ducts being next to this film and having a central upwardly tapering protuberance (108) positioned a short distance away from the film to be sealed and containing at least one straight vertical slit (27) formed by a continuous fissure or by a line of holes, which communicates with an internal chamber (28) inside the said cap (8), the chamber in turn communicating with the hole (204) connected to the helical channel (4) supplying the utilizing appliance, all in such a way that when this channel is supplied with the compressed air, the hot air knife useful in the film (F) heat-sealing operation emerges from the said slit (27).

8. Generator according to Claim 7, characterized in that it is guided through the external jacket (10) by fixed vertical guide means (22) which directly or indirectly support, and to which there is attached, a nut (23) engaging with a vertical screw (24) with an adjusting knob (124) at its bottom end while its top end is connected axially and freely rotatably to a projection (25) integral for example with the external jacket (10), the whole in such a way that by means of the said screw (24) it is possible to precisely adjust the distance between the present apparatus and the film to be sealed (F), depending on the characteristics of this film, a spring (26) being located 5 between the said projection (25) and the nut (23) in order to push the hot-air generator upwards with at least a force approximately equal to the force of the weight 10 of the said generator, in order to facilitate the turning of the said adjusting screw (24).

9. Generator according to Claim 6, characterized in that if it is intended for the formation of a unit for cutting plastic film or sheets and for this purpose projecting an air pencil or knife at the correct pressure and temperature, the said generator is oriented at right angles to the surface to be cut, the cap (8) with the hot air outlet ducts being next to this surface having an upwardly tapering central protuberance (108) positioned a short distance away from the said surface to be cut and containing 15 a precision-made incision or hole or nozzle which communicates with an internal chamber (28) inside the said cap (8), this chamber in turn communicating with the hole (204) connected to the helical channel (4) supplying the utilizing appliance, all in 20 such a way that when this channel is supplied with compressed air, the hot compressed air knife or pencil useful for cutting the nearby plastic sheet or film 25 emerges from the said precision-made incision, hole or nozzle.

10. Generator according to Claim 9, characterized in that it can be used statically for making in-line cuts or in that it can be mounted on simple or complex movement means for making travelling or shaped cuts.